

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

- 1           1.       (Currently Amended) An apparatus for routing data between  
2 integrated circuit devices, comprising:  
3           an ~~n-dimensional~~ two-dimensional grid of integrated circuit devices;  
4           a plurality of communication networks coupling the ~~n-dimensional~~ two-  
5 dimensional grid of integrated circuit devices, ~~wherein a communication network~~  
6 ~~of the plurality of communication networks moves data unidirectionally in only~~  
7 ~~orthogonal dimensions wherein the plurality of communication networks includes:~~  
8                 a first separate communication network configured to move data  
9                 unidirectionally in a North direction and an East direction along  
10                communication lines used by only the first communication network;  
11                a second separate communication network configured to move data  
12                unidirectionally in the North direction and a West direction along  
13                communication lines used by only the second communication network;  
14                a third separate communication network configured to move data  
15                unidirectionally in a South direction and the East direction along  
16                communication lines used by only the third communication network; and  
17                a fourth separate communication network configured to move data  
18                unidirectionally in the South direction and the West direction along  
19                communication lines used by only the fourth communication network; and

20 a routing mechanism configured to route data across the plurality of  
21 communication networks as well as into, out of, and through a given integrated  
22 circuit within the ~~n-dimensional~~two-dimensional grid of integrated circuits;  
23 whereby a process of routing ~~signals~~data across a given communication  
24 network is greatly simplified because it is not possible to create a cycle that causes  
25 a deadlock within the given communication network; and  
26 whereby the process of routing ~~signals~~data yields a shortest path between  
27 source and destination.

1 2. (Original) The apparatus of claim 1, wherein the n-dimensional  
2 grid of integrated circuit devices includes memory devices.

1 3. (Original) The apparatus of claim 1, wherein the n-dimensional  
2 grid of integrated circuit devices includes processor devices, I/O devices, digital  
3 signal processors, field programmable gate arrays, sensors, and controllers.

1 4. (Cancelled)

1 5. (Original) The apparatus of claim 1, wherein the routing  
2 mechanism is configured to statically route data items across the plurality of  
3 communication networks.

1 6. (Original) The apparatus of claim 1, wherein the routing  
2 mechanism is configured to dynamically route data items through network  
3 junctions within each integrated circuit.

1 7. (Original) The apparatus of claim 1,

wherein a header attached to each data item in a two-dimensional grid indicates a number of horizontal steps and a number of vertical steps required for the data item to reach its destination; and

wherein during a dynamic routing process, the routing mechanism removes a horizontal step or a vertical step from the header for the data item, depending upon which direction is dynamically selected.

8. (Currently Amended) A method for creating a computing system, comprising:

~~creating an n-dimensional a two-dimensional grid of integrated circuit devices;~~

~~establishing a plurality of communication networks coupling the n-dimensional two-dimensional grid of integrated circuit devices; wherein a communication network of the plurality of communication networks moves data unidirectionally in only orthogonal dimensions, wherein establishing the plurality of communication networks involves;~~

establishing a first separate communication network configured to move data unidirectionally in a North direction and an East direction along communication lines used by only the first communication network;

establishing a second separate communication network configured to move data unidirectionally in the North direction and a West direction along communication lines used by only the second communication network;

establishing a third separate communication network configured to move data unidirectionally in a South direction and the East direction along communication lines used by only the third communication network;  
and

21                    establishing a fourth separate communication network configured  
22                    to move data unidirectionally in the South direction and the West direction  
23                    along communication lines used by only the fourth communication  
24                    network; and  
25                    providing a routing mechanism configured to route data across the  
26 plurality of communication networks as well as into, out of, and through a given  
27 integrated circuit within the ~~n-dimensional~~ two-dimensional grid of integrated  
28 circuits;  
29                    whereby a process of routing ~~signals~~ data across a given communication  
30 network is greatly simplified because it is not possible to create a cycle that causes  
31 a deadlock within the given communication network; and  
32                    whereby the process of routing ~~signals~~ data yields a shortest path between  
33 source and destination.

1                    9.        (Original) The method of claim 8, wherein the n-dimensional grid  
2 of integrated circuit devices includes memory devices.

1                    10.       (Original) The method of claim 8, wherein the n-dimensional grid  
2 of integrated circuit devices includes processor devices, I/O devices, digital signal  
3 processors, field programmable gate arrays, sensors, and controllers.

1                    11.       (Cancelled)

1                    12.       (Original) The method of claim 8, wherein the routing mechanism  
2 is configured to statically route data items across the plurality of communication  
3 networks.

1           13.     (Original) The method of claim 8, wherein the routing mechanism  
2 is configured to dynamically route data items through network junctions within  
3 each integrated circuit.

1           14.     (Original) The method of claim 8,  
2 wherein a header attached to each data item in a two-dimensional grid  
3 indicates a number of horizontal steps and a number of vertical steps required for  
4 the data item to reach its destination; and  
5 wherein during a dynamic routing process, the routing mechanism  
6 removes a horizontal step or a vertical step from the header for the data item,  
7 depending upon which direction is dynamically selected.

1           15.     (Currently Amended) A means for routing data between integrated  
2 circuit devices within ~~an n-dimensional~~ a two-dimensional grid of integrated  
3 circuit devices, comprising:  
4 a communication means comprising a plurality of communication  
5 networks coupling the ~~n-dimensional~~ two-dimensional grid of integrated circuit  
6 devices, wherein ~~a communication network of the plurality of communication~~  
7 ~~networks moves data unidirectionally in only orthogonal dimensions~~  
8 a first separate communication network moves data  
9 unidirectionally in a North direction and an East direction along  
10 communication lines used by only the first communication network;  
11 a second separate communication network moves data  
12 unidirectionally in the North direction and a West direction along  
13 communication lines used by only the second communication network;  
14 a third separate communication network moves data  
15 unidirectionally in a South direction and the East direction along  
16 communication lines used by only the third communication network; and

17                    a fourth separate communication network moves data  
18                    unidirectionally in the South direction and the West direction along  
19                    communication lines used by only the fourth communication network; and  
20                    a routing means for routing data across the plurality of communication  
21 networks as well as into, out of, and through a given integrated circuit within the  
22 ~~n-dimensional~~ two-dimensional grid of integrated circuits;  
23                    whereby the means of routing ~~signals~~ data yields a shortest path between  
24 source and destination.

1                    16.        (Original) The means of claim 15, wherein the n-dimensional grid  
2 of integrated circuit devices includes memory devices.

1                    17.        (Original) The means of claim 15, wherein the n-dimensional grid  
2 of integrated circuit devices includes processor devices, I/O devices, digital signal  
3 processors, field programmable gate arrays, sensors, and controllers.

1                    18.        (Cancelled)

1                    19.        (Original) The means of claim 15, wherein data is configured to  
2 statically routed across the plurality of communication networks.

1                    20.        (Original) The means of claim 15, wherein data is dynamically  
2 routed through network junctions within each integrated circuit.

1                    21.        (Original) The means of claim 15,  
2 wherein a header attached to each data item in a two-dimensional grid  
3 indicates a number of horizontal steps and a number of vertical steps required for  
4 the data item to reach its destination; and

5                wherein during a dynamic routing process, a horizontal step or a vertical  
6    step is removed from the header for the data item, depending upon which  
7    direction is dynamically selected.